

**TECHNICAL MANUAL}**  
**No. 5-1067**

**DEPARTMENT OF THE ARMY**  
**WASHINGTON 25, D. C., 21 October 1953**

# **ROLLER, ROAD, TOWED TYPE, SHEEPSFOOT, 2 AND 3 DRUMS IN LINE, AMERICAN STEEL WORKS MODELS MT-144, MD-96, AND MD-120**

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## **SAFETY PRECAUTIONS**

Two quarts of oil should be added to water used as ballast, to prevent rust.

Antifreeze must be used when operating the roller under freezing conditions. If freezing weather prevails, and no antifreeze is used, be sure to drain the roller properly.

Never overweigh the roller to the point that the drums are rolling on the ground continuously.

The roller must be parked and properly blocked on a firm level footing when stored.

If the roller is out of operation for a day or two, all unpainted surfaces should be covered with a light coat of rust preventive compound.



# CHAPTER 1

## INTRODUCTION

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### Section I. GENERAL

#### 1. Scope

a. This manual is published for the information and guidance of the personnel to whom this roller is issued. The manual contains information on the operation and organizational maintenance of the roller, as well as a description of the major units and their functions in relation to other parts of the equipment. It applies only to the Road Roller, Towed Type, Sheepfoot 2 and 3 Drums in Line, American Steel Works Models MT-144, MD-96, and MD-120, as modified by military specifications.

b. Supply manuals, technical manuals, and other publications applicable to the equipment covered by this manual are listed in appendix I. Appendix II lists replaceable parts together with their stock numbers, functions, and standard nomenclatures.

#### 2. Record and Report Forms

Maintenance record forms listed and briefly described in *a* through *l* below will be used in the maintenance of this equipment.

a. *DD Form 110, Vehicle and Equipment Operational Record.* This form is used by equipment operators for reporting the accomplishment of daily preventive maintenance services, and for reporting any equipment deficiencies observed during operation.

b. *Standard Form 91, Operator's Report of Motor Vehicle Accident.* One copy of this form is kept with the equipment at all times. In case of an accident resulting in injury or property damage, Form 91 is filled out immediately (or as promptly thereafter as is practical) by the operator.

c. *DA Form 464, Work Sheet for Preventive Maintenance and Technical Inspection of Engineer Equipment.* This form is used by personnel of the using organization and higher echelons for reporting the results of preventive maintenance services and technical inspections.

d. *DA Form 460, Preventive Maintenance Roster.* This form is used for maintaining an operating time record on the item of equipment, and for scheduling lubrication and preventive maintenance services at proper intervals.

e. *DA Form 478, MWO and Major Unit Assembly Replacement Record.* Major repairs or rebuilding, replacement of major unit assemblies, and accomplishment of equipment modifications are recorded on this form.

f. *DA Form 468, Unsatisfactory Equipment Report.* This form is used for reporting manufacturing, design, or operational defects in the materiel, with a view to correcting such defects; it is also used for recommending modifications of the materiel. Form 468 is not used for reporting failures, isolated materiel defects, or malfunctions of materiel resulting from fair wear and tear or accidental damage. Form 468 is not used to report issue of parts and equipment, or for reporting replacements and/or repairs.

g. *DD Form 6, Report of Damaged or Improper Shipment.* This form is used for reporting damages incurred in shipment.

h. *DA Form 9-81, Exchange Part or Unit Identification Tag.* This form is used to accomplish the direct exchange of unserviceable for serviceable parts.

i. *DA Form 811, Work Request and Job Order.* This form is used to request work done by higher echelon organizations.

j. *DA Form 867, Status of Modification Work Order.* This form is used to maintain records of all modification work performed on equipment.

k. *DA Form 5-13, Spot Check Inspection Report of Organizational Maintenance of Engineer Equipment.* Organizations having engineer field maintenance responsibility use this form for reporting the results of semiannual spot-check inspections.

l. *DA Form 5-14, Annual Technical Inspection Report of Engineer Equipment.* Organizations having engineer field maintenance responsibility use this form for reporting the results of annual technical inspection.

## Section II. DESCRIPTION AND DATA

### 3. Description

a. *General.* The American Sheepsfoot roller (fig. 1) is made up of the towing frame and cylindrical section positioned in the frame by a shaft through the cylinder.

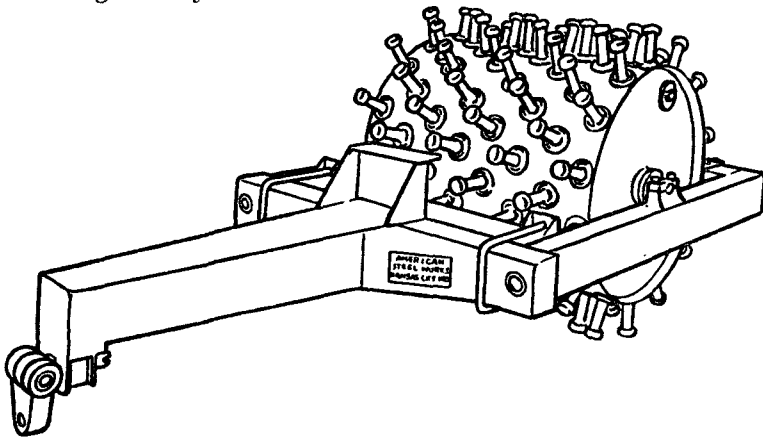


Figure 1. Single roller assembly.

*b. Drums.* The cylinder is a watertight, welded steel drum, equipped with permanently attached feet staggered around the curved surface of the drum. A longitudinal tube through the center of the cylinder protects the axle from dirt and water. This roller drum is fitted with two openings to be used for filling the drum with water or sand or both, for various compaction requirements.

*c. Frame.* The box member frames that surround and control the movement of the roller are made up with bearing blocks to position the shaft, connecting devices to position the towing tongue, and cable loops to aid in equalizing the towing pull during multiple roller operation. Holes are also placed in the frame members for bolting cleaning teeth to the rear member. Connection devices are provided for operating two or three rollers in line (figs. 2 and 3), using one towing tongue.

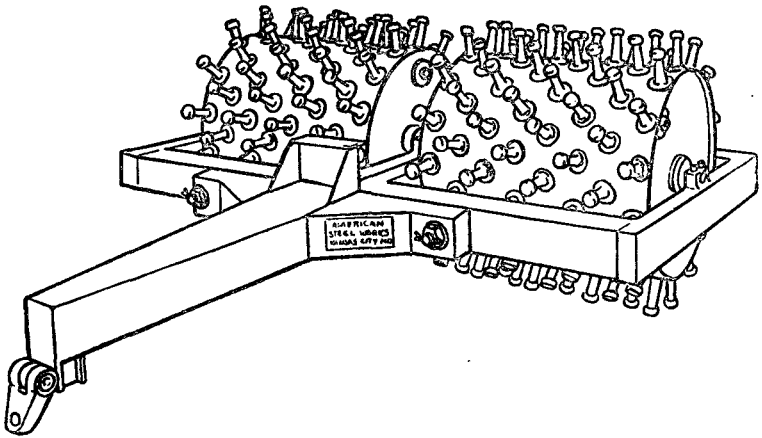


Figure 2. Double drum assembly.

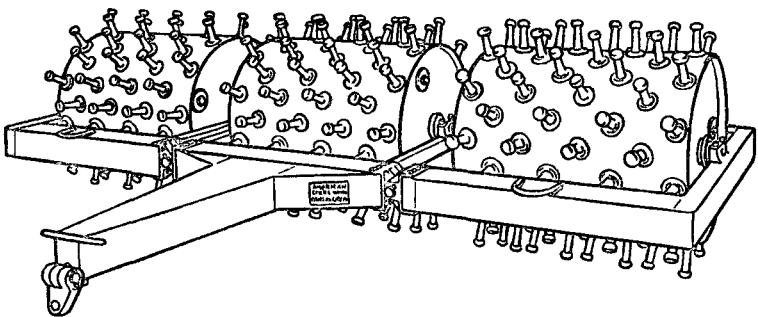


Figure 3. Triple drum assembly.

*d. Axle.* The axle shafts extend the full length of each drum. These shafts remain stationary while the rollers rotate. This shaft is protected from mud and water by an inner steel axle sleeve.

#### 4. Identification

The Corps of Engineers identification plate is located on the frame or tongue frame, according to the combination of drums in use. This plate specifies the official nomenclature, model number, and serial number of the equipment. When requisitioning spare parts, specify the Department of the Army registration and serial number.

#### 5. Tabulated Data

	MD-120	MT-144	MD-96
Length, overall, including drawbar.....	13' 0''.....	11' 7''.....	15' 2''.
Width overall.....	11' 10''.....	15' 0''.....	10' 2''.
Number of drums.....	2.....	3.....	2.
Length of each roller drum.....	5' 0''.....	4' 0''.....	4' 0''.
Outside diameter, roller drum without feet.	3' 4''.....	3' 4''.....	5' 0''.
Outside diameter over feet.....	4' 6''.....	4' 6''.....	6' 2''.
Length of feet.....	7''.....	7''.....	7''.
Square inch bearing surface (each foot).....	5½''.....	5½''.....	7''.
Number of feet on ground.....	10.....	12.....	6.
Number of feet per drum.....	140.....	88.....	90.
Total number of feet.....	280.....	264.....	180.
Empty weight as shipped.....	7,638 lbs.....	8,500 lbs.....	9,740 lbs.
Total weight (filled with water).....	12,278 lbs.....	14,100 lbs.....	18,062 lbs.
Total weight (filled with sand).....	16,654 lbs.....	16,450 lbs.....	25,552 lbs.
Ground pressure per square inch (empty).....	139 lbs.....	128 lbs.....	232 lbs.
Ground pressure per square inch (filled with water).	223 lbs.....	215 lbs.....	430 lbs.
Ground pressure per square inch (filled with sand and water).	301 lbs.....	292 lbs.....	608 lbs.



## CHAPTER 2

# OPERATING INSTRUCTIONS

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### Section I. SERVICE UPON RECEIPT OF EQUIPMENT

#### 6. New Equipment

*a. General.* The assembled roller drums and frames should be unloaded and placed so that they may be easily connected. Each item must be inspected for damage incurred during shipment.

*b. Unloading.* Remove all blocks, supports, and other fastening means from the roller. The roller, together with its accompanying frame, may be hoisted by slings through the corners of the frame.

**Caution:** Care should be exercised in unloading the roller so that it is set down on a flat, firm surface to avoid damage to the drum.

*c. Removal of Preservative Compounds, Lubricants, and Devices.* Before assembling and placing the roller in operation, remove barrier material or preservative that has been used to cover a machined or polished surface.

*d. Assembling.* For operation with two or three drums, position the rollers so that the connecting pins and lugs line up.

*e. Inspection.* The roller must be inspected before it is placed in operation. See if there are signs of cracks, breaks, or parts that have been bent or damaged during transportation. The bearings must be checked to make certain they have been lubricated.

*f. Service.*

(1) Lubricate the roller as specified in paragraph 16.

(2) Service as instructed in paragraphs 19 through 21.

(3) To add water or sand ballast to the roller, use the 4-inch threaded plug, located at each end of the drum. However, in order to facilitate the loading of ballast (other than water), it may be necessary to cut a larger opening in the roller. If this is done, construct a permanent access door.

*Note.* It will be necessary to seal this door with a gasket if water is used.

#### 7. Equipment Conversion

The roller is equipped for multiple side-by-side operation, or a rear hitch is provided, so that rollers may be worked in trains.

#### 8. Used Equipment

Used equipment should be serviced in the same manner as new equipment (par. 6). The roller should be inspected thoroughly before it is placed in operation. See that the bearings are adjusted

to eliminate play on the shaft, and be sure that the bearings are correctly lubricated. Check for cracks, breaks, or parts that have been damaged during transportation. The roller should be clear of mud and dirt, to prevent tearing of soil due to sticking.

## Section II. OPERATION UNDER USUAL CONDITIONS

### 9. General

a. The instructions in this section are published for the information and guidance of the personnel responsible for the operation of this roller.

b. It is essential that the operator know how to perform every operation of which the equipment is capable. This section contains instructions for the basic movements and equipment combinations. Since every job presents a different problem, the operator may have to vary the given procedure to fit the individual job.

c. The functions of the sheepsfoot roller are simple. The drums turn forward when the roller is being pulled by the tractor, the tapered feet entering the ground to compact the earth. The drums act independently to conform to the contour of the ground.

### 10. Operating Details

a. The roller should be moved slowly to insure good compaction.

b. The roller should be weighted, if necessary, with sand or water, so that sufficient foot pressure can be obtained to compact the type of soil encountered.

c. Pull the roller back and forth over the compaction area until the end of the area is reached. Turn the tractor and roller around and retrace the route taken. This retracing and tamping is to be continued until the roller rides high on the ends of the feet and the dirt has reached the specified compaction.

**Caution:** Never overweight the roller to the point that the drum itself is rolling on the ground continuously.

d. When tamping a fill, care should be taken not to spread too deep a "list" or layer of dirt for each tamping. In most cases, the dirt should not be spread much deeper than the length of the feet, which is 7 inches. These general instructions will vary for the type of dirt being worked, content of moisture, and amount of compaction specified for the job.

e. For multiple roller operation, the rollers may be coupled side-by-side, or they may be coupled in a train, one behind the other. For side-by-side operation, the towing tongue should be attached to the center drum.

**Caution:** Always make certain that sufficient turning space is available for multiple roller operation.

## **11. Movement to New Location**

Before moving the roller to a new location, remove all ballast. Clean the outside surfaces of the roller thoroughly and lubricate according to the lubrication instructions. If the roller is to be stored, paint exposed surfaces.

**Caution:** If exposed metal surfaces are covered with rust preventive, make sure that the rust preventive is removed before beginning the next operation.

## **Section III. OPERATION UNDER UNUSUAL CONDITIONS**

### **12. Operation in Muddy or Cold Conditions**

The usefulness of this roller is seriously impaired if the ground is too wet or if it is frozen too hard for the tamping feet to penetrate. Lighter lubricants should be used when operating in cold temperatures (refer to lubrication instructions).

**Caution:** Add antifreeze to water or water-and-sand ballast if freezing temperatures are expected.

### **13. Operation in Dry or Dusty Conditions**

If the roller is to be operated over ground that is extremely dry and dusty, it will be necessary to saturate the ground thoroughly with water before the proper degree of compaction can be obtained.

# CHAPTER 3

## ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

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### Section I. SPECIAL ORGANIZATIONAL TOOLS AND EQUIPMENT

#### 14. General

The tools, parts, and equipment sets supplied with or issued for use with this roller are listed in the Department of the Army supply manuals.

#### 15. Special Organizational Tools and Equipment

A spanner wrench designed to fit the holes in the inner half of the axle bearing must be with the roller at all times.

### Section II. LUBRICATION AND PAINTING

#### 16. Lubrication

There are six lubrication points on the rollers. The rollers are equipped with grease fittings at each axle end for lubrication of the tapered roller bearings. These points should be checked and lubricated at regular intervals. A light lubricating oil should be used for lubricating the towing hitch and clevis pins.

#### 17. Painting

If the paint has deteriorated or is damaged in cleaning, remove the loose paint, rust, or other corrosion and repaint in accordance with TM 9-2851. Be careful not to paint over the identification plate. Do not allow the paint to enter lubricated working parts, such as the axle and the bearing surfaces.

### Section III. PREVENTIVE MAINTENANCE SERVICES

#### 18. General

The operator of this equipment and the organizational maintenance personnel must perform their preventive maintenance services regularly, to insure satisfactory operation of the roller and to reduce probabilities of mechanical failure.

#### 19. Operator Maintenance

*a. Inspection.* Inspection must be made before operation, during operation, at halt, and after operation, as described in this section. All inspections of assemblies, subassemblies, or parts must include all supporting members or connections and must determine whether the

unit is in good condition, correctly assembled, secure, or worn. A mechanical condition that may result in damage to the unit must be corrected before the roller is operated. The terms "good condition," "correctly assembled," "secure," and "worn" are explained as follows:

- (1) The inspection for "good condition" is usually an external visual inspection to determine whether the unit is damaged beyond safe and serviceable limits, or to determine if it is in such a condition that damage will result from operation. The term "good condition" is further defined as: not bent, or twisted; not chafed or burned; not broken or cracked; not bare or frayed; not dented or collapsed; nor torn or cut; adequately lubricated.
- (2) Inspection of a unit to see that it is "correctly assembled" is usually an external, visual inspection to determine whether it is in its normal assembled position in the equipment.
- (3) The check of a unit to determine if it is "secure" is usually an external inspection, a hand-feel, a pry-bar, or wrench check for looseness in the unit. Such an inspection should include brackets, lockwashers, locknuts, locking wires, or cotter pins used in the assembly.
- (4) "Worn" means worn close to or beyond serviceable limits, a condition likely to result in failure if replacement of the affected parts is not made before the next scheduled inspection.

*b. Reporting Deficiencies.* The operator will report all deficiencies on DD Form 110.

*c. Before-Operation Services.* The following services will be performed to determine if the condition of the equipment has changed since it was last operated and to make sure the machine is ready for operation.

- (1) *Water.* If water is being used for ballast, move the roller until a fill plug is at the highest point, with the roller on level ground. The plug can then be removed and the level of the water checked. Replenish if necessary. Add 2 quarts of oil to the water, as a means of rust prevention. If freezing weather prevails, be sure to use antifreeze. Check for water leaks. Particular attention should be paid to the ballast opening plug.
- (2) *Visual inspection.* Make a visual inspection of the entire unit for cracks, breaks, and loose or missing bolts and nuts. Also check the universal swivel clevis at the end of the towing tongue for ease of operation. Examine all hinge pins and locking cotter pins.

*d. During-Operation Services.* The operator is responsible for correcting or reporting unusual sounds or odors, deficiencies in performance, or other signs of abnormal operation.

(1) *Unusual operation.* Check for unusual operation such as excessive play of the hinge pins, and end play of the drums on the axles. Report irregularity immediately to the proper authority.

(2) *Unusual noises.* Check for unusual noise, such as axles binding or bearings loose enough to allow end play.

e. *At-Halt Services.* During halts, even for short periods, the operator should make a general check of the equipment and correct or report all deficiencies noticed, in addition to performing the following specific duties:

(1) *Water.* Check the water ballast in the roller and add water if necessary. Check the freezing point if antifreeze is used.

(2) *Frame.* Check the frame for cracks or breaks. Check the hinge pins and cotter pins for secure mounting. Inspect the cleaner teeth for wear and damage.

(3) *Bearings.* See that axles and bearings are free of dirt or mud. Inspect for indications of insufficient lubrication.

(4) *Visual inspection.* Make an inspection of the entire unit. Check for loose or missing bolts, nuts, and cotter pins. Check for cracked, broken, or bent members.

f. *After-Operation Services.* To insure that the equipment is ready to operate at all times, the following services must be performed by the operator or crew immediately after an operating period of 8 hours or less. All deficiencies must be corrected or reported to the proper authority.

(1) *Shutdown precautions.* Place the roller in an area where it is least likely to be damaged. See that the footing is firm and level; use plank if necessary. Block up the towing hitch.

(2) *Ballast.* If water is used as ballast, check the rollers for leaks. If freezing weather is expected, drain rollers completely, unless antifreeze is used. Check freezing point of solution.

(3) *Clean equipment.* Clean the entire unit. See that all dirt and mud are cleaned from bearings, cleaning teeth, and tamper feet.

(4) *Tools and equipment.* See that all tools and equipment assigned to the equipment are in serviceable condition, clean, and properly stowed.

(5) *Lubrication.* Lubricate as specified in the lubrication instructions (par. 16).

(6) *Visual inspection.* Make a visual inspection of the entire roller for cracked or broken parts and loose or missing bolts, nuts, and cotter pins. Inspect frame coupling pins and yoke for secure mounting and good condition.

(7) *Protection.* See that the roller is located on a firm, level footing. Should the roller be out of operation for more than

2 days in exposed locations, the unpainted parts must be covered with a light coat of rust preventive compound.

## 20. Maintenance and Safety Precautions

- a. Correct or report mechanical deficiencies that may result in damage to the roller if operation is continued.
- b. See that the roller and the towing hitch are blocked before uncoupling from the towing unit.
- c. If water is used for ballast, be sure that it is drained from the roller when freezing temperatures are expected. If antifreeze solution is used, check the solution's freezing point.

## 21. Organizational Maintenance

- a. Organizational preventive maintenance is performed by organizational maintenance personnel, with the aid of the operator, at weekly and monthly intervals. The weekly interval will be equivalent to 60 hours of use; the monthly interval (4 weeks) will be equivalent to 240 hours of use.
- b. The column headed technical inspection is provided for information and guidance of personnel performing technical inspection, and constitutes the minimum inspection requirements for the equipment.
- c. The preventive maintenance services to be performed at these regular intervals are listed and described below. The numbers appearing in the columns opposite each service refer to a corresponding number appearing on DA Form 464, and indicate that a report of the service should be made at that particular number on the form. These numbers appear in either the second, the third, or both columns, as an indication of the interval at which the service is to be performed.

Technical inspection	Services		
	Monthly	Weekly	
1	1	1	<i>Before operation services.</i> Check and perform services listed in paragraph 6.
2	2	2	<i>Lubrication.</i> Inspect the roller for missing or damaged lubrication fittings, and for indication of insufficient lubrication.
		2	Lubricate if necessary. Replace missing or damaged fittings. See paragraph 16.
3	3	3	<i>Tools and equipment.</i> Inspect the condition of all tools and equipment assigned to the machine.
		3	See that all tools and equipment assigned to the roller are clean, serviceable, and properly stowed or mounted.
5	5	5	<i>Publications.</i> See that this technical manual and Standard Form 91 are on the roller and in serviceable condition.
6	6	6	<i>Appearance.</i> Inspect the general appearance of the machine, paying special attention to cleanness, legibility of identification markings, and condition of paint.

Technical inspection	Services		
	Monthly	Weekly	
7	7	-----	<i>Modifications.</i> See that all available modification work orders applying to this machine have been completed and recorded on DA Form 478, MWO and Major Unit Replacement Record.
77	77	77	<i>Tow hitch.</i> Inspect the tow hitch for loose or missing bolts, nuts, and cotter pins.
	77	77	Tighten or replace loose or missing bolts, nuts, and cotter pins.
80	80	80	<i>Frame.</i> Inspect the frame for cracks, broken welds, and loose and missing bolts.
	80	80	Tighten or replace all loose or missing bolts, nuts, and cotter pins. See that cracks, breaks, and broken welds are repaired before further damage results.
	80	-----	Remove and inspect the hinge pins and yokes for good condition. Renew pins or hinge brackets if worn to the point where they might break easily.
84	84	84	<i>Axle and bearing.</i> Inspect the axles for proper alinement. Check the bearings for proper adjustment.
	84	84	Report all deficiencies noticed in axle alinement. Adjust bearings by loosening the two set screws that secure the take-up ring, and turn the ring clockwise until it is snug. Retighten the set screws and move the roller to make sure that the bearing does not bind.
133	133	133	<i>Cleaner teeth.</i> Inspect for loose or missing mounting bolts, cracks, broken welds, and loose or missing cleaner teeth.
	133	133	Tighten or replace loose or missing bolts, nuts, and cleaner teeth. Report cracks, broken welds, or missing cleaner teeth.
134	134	134	<i>Tamping feet.</i> Inspect for loose or missing feet.
	134	134	Reweld or replace loose or missing feet.
135	135	135	<i>Roller drums.</i> Inspect the roller drums for cracks, breaks, leaks, improper mounting, weak welds, and defective ballast openings or covers. Check for loose or missing mounting studs.
	135	135	Repair or report to the proper authority all cracks and breaks on the roller drums. Repair weak welds, leaks, and defective ballast openings or covers. Replace the damaged or missing ballast covers. See that the roller drums are properly and securely mounted. Tighten or replace loose or missing mounting studs.
136	136	136	<i>Rear stabilizer bar.</i> Check the rear stabilizer bar for cracks, breaks, insecure mounting on frame, and a clogged or badly worn hitch.
	136	136	Repair or report to the proper authority a cracked or broken stabilizer bar. Replace and tighten missing or loose mounting nuts and bolts. Replace the bar if the hitch is defective or badly worn. Remove all obstructions from the hitch.



## Section IV. TROUBLESHOOTING

### 22. Use of Troubleshooting Section

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the roller or its parts. Each trouble stated is followed by a list of probable causes of the trouble. The possible remedy is described opposite the probable cause.

### 23. Roller Drags, Heats

<i>Probable cause</i>	<i>Possible remedy</i>
Bearing too tight-----	Adjust bearing.
Bearing broken-----	Replace bearing.

### 24. Roller Leaks

<i>Probable cause</i>	<i>Possible remedy</i>
Burn through foot- ----- weld.	Reweld foot.

### 25. Operates Erratically

<i>Probable cause</i>	<i>Possible remedy</i>
End play in drum-----	Adjust bearing and drum locking device.
End play in drum axle.	Aline drum and tighten bearing block cap screw.
One or more feet loose or missing.	Correct or report to the proper authority.
Towing tongue loose---	Tighten oscillating bolts.

## Section V. MAINTENANCE PROCEDURES

### 26. General

Repairs to the roller cylinder with the exception of the axle tube can be made without disassembly. A leak in the axle tube or a leak in the welds which fasten the axle tube to the drum ends will necessitate removing the cylinder from the frame.

### 27. Axle

#### *a. Removal.*

- (1) Disconnect the roller section to be repaired from the remainder of the unit.
- (2) Block up the frame or fasten to crane slings.
- (3) Remove the screws on the pillow caps on both sides of the drum.
- (4) Lower the frame to the ground or move it away by use of the crane.
- (5) Loosen the two set screws that secure the bronze take-up ring, and remove the ring. Use a spanner wrench or tap with a small punch and hammer.

- (6) Remove the alemite grease seal. Remove the jam nut.
- (7) Remove the tapered roller bearing cone and cup. Place a block of wood on the end of the axle shaft and tap it lightly with a hammer. This will move the entire assembly free of the bearing housing. Pry or bump the cone and cup free of the axle. Repeat this procedure for the opposite bearing assembly. Remove the inside grease seal.

**Caution:** When removing the roller bearings, make sure to place them on a piece of canvas, wood, or other material free of dust and dirt. Make sure the roller bearings are kept free of sand.

- (8) Remove the axle from the axle housing (tube).
- (9) Use a claw puller to remove the bearing cup from the bearing housing.

**Caution:** When removing the bearing assemblies, be sure that the method used does not damage working parts.

**b. Inspection.**

- (1) Thoroughly clean all disassembled parts in an approved cleaning solvent. Dry the parts individually with a clean cloth.
- (2) Inspect the pillow caps for cracks or breaks.
- (3) Inspect the cap screws for cracks or breaks, and see that the threads are in good condition.
- (4) Inspect the set screws and jam nuts for cracks and wear.
- (5) Inspect the bronze take-up ring for wear and damage.
- (6) Inspect the condition of the alemite grease seals and the zerk grease fittings.
- (7) Inspect the bearing cup for cracks or breaks. See that it is not pitted or scored.
- (8) Inspect the bearing cone for worn or chewed bearings. See that the bearings are free to rotate and that there are no cracks or breaks.
- (9) Inspect the axle for misalignment and wear.
- (10) Inspect the bearing closure for cracks or breaks. See that it is not pitted or scored.

**Caution:** If either the bearing cone or cup must be replaced, replace both. Never install new bearings in damaged housings or on damaged shafts. Sand or dirt in the bearings will cause premature failure and result in further damage.

**Note.** The importance of cleanness in handling the bearings cannot be emphasized too strongly.

**c. Assembly.**

- (1) If the frame has been moved away, lower it over the drum.
- (2) Never attempt to reinstall the bearings or parts of the housing assembly unless they are thoroughly cleaned.

- (a) Clean the bearing housing with compressed air if necessary. Make sure it is free of all foreign matter.
  - (b) Clean the axle housing; be sure there are no obstructions in the passage.
  - (c) Be sure the bearings are free of dirt and grit.
- (3) Insert the bearing cups in the bearing housing. Use a cup driver to drive the cups in until they fit tightly. Repeat this procedure for the opposite side of the unit.
- Caution:** The bearing cups must fit tightly. If the cup drives into the housing too easily, it indicates that the cup bore has been worn. Report such condition to the proper authority, as it may require replacement of the bearing cup and the bearing cone.
- (4) Insert the axle in the tube.
  - (5) Place the inside grease seal, cone, and cup on the axle; use a block of wood and tap it lightly with a hammer.
  - (6) Position the bearing jam nut, adjust to proper tightness, and pack with GP grease.
  - (7) Insert a new alemite grease seal.
  - (8) Position the bronze take-up ring and fasten the two set screws properly.
  - (9) By use of a hoist, raise the frame until the axle is seated, and fasten the pillow cap screws and lock washers.
  - (10) Make a visual inspection of the unit, paying particular attention to frame alinement and tightness of screws. Connect the roller section to the remainder of the unit.

**Caution:** Be sure to lubricate as specified in the lubrication section before starting to operate again, otherwise the bearings will run dry and cause serious damage to the equipment.

## 28. Bearing Housing

*a. Removal.* Remove the axle. See (par. 27a) for removal instructions.

- (1) In order to remove the bearing housing and the axle tube, chip off most of the original weld head with a cold chisel, taking care to leave enough of the original head to hold the new tube in place.
- (2) Insert a long, solid bar through the drums and let both ends rest on blocks or other suitable supports.
- (3) Use an acetylene torch to cut out the old weld on both sides of the drum (cylinder).
- (4) Slide the tube and housings out of the drum on the bar.

*b. Inspection.*

- (1) Inspect the tube for leaks. Replace the tube if damaged or worn beyond repair.

- (2) Inspect the tube for corrosion.
- (3) Clean the tube thoroughly by use of a wire brush and approved cleaning solvent. Apply rust preventive compound.
- (4) Inspect for leaks in the tube weld where the tube is connected to the bearing housings.
- (5) Such leaks will be repaired by chipping out the weld adjacent to the leak, and rewelding.

*c. Assembly.*

- (1) Slide the bearing assemblies and tube back into the drum.
- (2) Weld the tube (bearing housings) in place with a continuous bead around both ends. Make certain enough heat is applied to burn thoroughly into the parent metal, and dense enough to make a tight weld. Grind off projecting metal after the weld has cooled.

**Caution:** Care must be taken to position the tube properly before it is welded, in order to insure accurate rotation of the drum.

- (3) Inspect for cleanness. Clean out the bearing housing with compressed air, if necessary.
- (4) Follow the instructions (par. 27c) for reassembly of the axle and bearing parts.

## 29. Frame

*a. Removal.*

- (1) Make sure the drum does not contain any ballast.
- (2) Block up the frame on both sides and remove the pillow cap screws.
- (3) Remove the pillow caps.
- (4) Lower the frame to the ground, or remove it by help of a hoist.

*b. Inspection.*

- (1) Inspect the frame for alinement, cracks, and corrosion.
- (2) A cracked frame may be welded. To prevent warping caused by overheating, the frame should be blocked firmly before welding.
- (3) Clean the frame thoroughly and grind off projecting metal. Apply rust preventive compound.

*c. Assembly.*

- (1) Position the pillow caps back on the axle.
- (2) Raise the frame and fasten the pillow caps. Tighten the cap screws properly.

## 30. Feet

Feet that are badly worn or damaged will be cut off with an acetylene torch and replaced by welding.

## CHAPTER 4

# SHIPMENT, LIMITED STORAGE, AND DEMOLITION TO PREVENT ENEMY USE

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### Section I. SHIPMENT AND LIMITED STORAGE

#### 31. Limited Storage

*a. Inspection.* Refer to organizational preventive maintenance services (par. 21).

*b. Cleaning and Painting.* Remove all mud, dirt, and oil or grease from the surfaces of the unit. Loose paint should also be removed and the edges of painted surfaces should be sanded to present a smooth surface. The unit should be allowed to dry thoroughly in a dust free area and the temperature should be at least 65° F. in order to insure a satisfactory job. Reference should also be made to TM 9-2851.

*c. Complete Lubrication.* Refer to paragraph 16.

*d. Protection in Storage.* Grease the bearing assemblies. Apply grease to the exposed portions of the shaft. Coat all machined parts of the coupling and hinge pins with grease.

#### 32. Domestic Shipment

*a. Hoisting and Handling.* Hoist the roller by slings placed through the corners of the frame.

**Caution:** Exercise care in landing the roller so that it is set down on a flat surface to avoid damage to the cylinder.

*b.* The roller sections must be placed on a plank not less than 2 inches thick. Chock the end of the towing bar. One end of the frame should be fastened to the deck of the car or truck. In case the deck of the conveyance is steel and no hold-down can be utilized, turn the roller sideways so the frame can be lashed to the side of the car or truck.

### Section II. DEMOLITION TO PREVENT ENEMY USE

#### 33. General

When capture or the abandonment of the roller to an enemy is imminent, the responsible unit commander makes the decision either to destroy the unit or to render it inoperative. Based on this decision, orders are issued which cover the desired extent of destruction. Whatever method of demolition is employed, it is essential to destroy the same vital parts of all rollers and all corresponding repair parts.

### **34. Preferred Demolition Methods**

The only quick and feasible method of rendering this roller inoperative is by the use of explosive; listed below are the vital parts in order of priority.

*a.* Place a 2-pound charge on each side of each of the frames, at the end of the axle.

*b.* Place a 2-pound charge on each of the four faces of the tongue where it connects to the frame of the roller.

# Appendix I

## REFERENCES

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### 1. Dictionaries of Terms and Abbreviations

- SR 320-5-1      Dictionary of United States Army Terms.  
SR 320-50-1     Authorized Abbreviations.

### 2. Preparation for Export Shipment

- TB 5-9711-1      Preparation of Corps of Engineers Equipment for Oversea Shipment.  
TB 5-9713-1      Preparation for Export, Spare Parts for Corps of Engineers Equipment.

### 3. Preventive Maintenance

- TM 5-505          Maintenance of Engineer Equipment.  
TM 9-2851        Painting Instructions for Field Use.

### 4. Publication Indexes

- SR 110-1-1       Index of Army Motion Pictures, Kinescope Recordings, and Film Strips.  
SR 310-20-3      Index of Training Publications.  
SR 310-20-4      Index of Technical Manuals, Technical Regulations, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.  
SR 310-20-5      Index of Administrative Publications.  
SR 310-20-6      Index of Blank Forms.

### 5. Tools and Spare Parts

- ENG 7 and        Roller, Road, Towed-Type; Sheepsfoot; 2  
8 1067-1         Drums in Line; MIL-R-1284; Class I;  
                     American Steel Model MD96.

### 6. Training Aids

- FM 21-8          Military Training Aids.

## Appendix II

## IDENTIFICATION OF REPLACEABLE PARTS

Note. The parts listed in this appendix are for information only and will not be used as a basis for requisitioning spare parts.

Engineer Stock No.		Manufacturer's part No.		Federal supply class and item identification No.	Description	Quantity per unit			
Code No.	Part No.	Code No.	Part No.			MD 96	MD 120	MT 144	
Section I. Standard hardware									
913	43-2325.060.025	960	5120-65	5305-263-7670	BOLT, machine, steel, NC, sq hd, w/sq nut $\frac{5}{8}$ in. dia, 2 $\frac{1}{2}$ in. long.	4	4	6	
913	43-2325.060.115	960	5120-64		BOLT, machine, steel, NC, sq hd, w/sq nut $\frac{5}{8}$ in. dia, 11 $\frac{1}{2}$ in. long.	28	28	42	
912	42-6880.400.250	960	5056-26		PIN, cotter, split, steel, $\frac{3}{8}$ x 2 $\frac{1}{2}$ in.	10	10	15	
913	43-9215.500.150	960	5058-28	187-5357	WASHER, wrought iron, rd, std, Type A, bolt size 1 $\frac{1}{2}$ in., 3 $\frac{1}{2}$ in. od, $\frac{3}{16}$ in. thick.	1	1	1	
913	43-9215.500.200	960		187-5361	WASHER, wrought iron, rd, std, single, Type A, bolt size 2 in., 4 $\frac{1}{2}$ in. od, $\frac{3}{16}$ in. thick.	13	13	19	
Section II. Identification of replaceable parts									
Group 10—Front axle									
1000—Front axle assembly									
			5055		AXLE SHAFT, 2" x 67 $\frac{3}{4}$ " long, with collar		2		
960	5055-9	960	5055-9		AXLE SHAFT, 2" x 55 $\frac{3}{4}$ " long, with collars	2	2	3	
			5055-10		COLLAR, thrust				
960	5118	960	5118		BASE, pillow block, 2"	4	4	6	
960	5049	960	5049		CAP, pillow block, 2"	4	4	6	



960	5048-13	960	5048-13	BOLT, machine-----	8	8	12
960	5048	960	5048	BEARING, 2", with housing-----	4	4	6
960	5050	960	5050	HOUSING, bearing-----	1	1	1
892	3720	960	3720	CUP, tapered roller bearing-----	1	1	1
892	3780	960	3780	CONE AND ROLLERS, tapered roller bearing-----	1	1	1
806	1610B	960	5048-5	FITTING, lubrication-----	4	4	6
960	5048-6	960	5048-6	SETSCREW-----	1	1	1
			5048-71	NUT, jam $\frac{3}{16}$ "-----	1	1	1
960	5051	960	5051	RING, bearing, take-up, roller axle-----	4	4	6
367	55369	367	55369	SEAL, bearing-----	4	4	6
367	50310	367	50310	SEAL, bearing-----	4	4	6
Group 15—Frame							
1501—Frame assembly							
960	5043	960	5043	FRAME-----	2	2	3
			3504	FRAME-----	1	1	14
			5120	TEETH, cleaning-----	1	1	1
		960	5124	BAR, rear draft-----	1	1	1
			5132	CLEVIS, rear frame member-----	1	1	1
			5115	TONGUE AND CENTER FRAME-----	1	1	1
			5116	FRAME, outside, (right or left)-----	1	1	1
			5057	HINGE HALF-----	1	1	2
			5119	PIN, 2" dia. hinge-----	1	1	2
1503—Pintles and towing attachments							
960	698	960	698	BOLT, eye-----	1	1	1
960	697	960	697	CLEVIS, swivel, roller tongue-----	1	1	1
960	5058	960	5058	PIN, straight headed-----	1	1	1
960	5054-24	960	5054-24	BOLT, swivel, tongue connecting-----	4	4	6
960	5054-25	960	5054-25	NUT, castelated, hexagon-----	9	9	12
960	5056	960	5056	TONGUE-----	1	1	1

Engineer Stock No.		Manufacturer's part No.		Federal supply class and item identification No.	Description	Quantity per unit		
Code No.	Part No.	Code No.	Part No.			MD 96	MD 120	MT 144
960	5044	960	5044	-----	Section II. Identification of replaceable parts—Con. Group 74—Earth working equipment 7435.7—Rolls with feet	2	2	
960	5114	960	5114	-----		88	88	
960	5044-21	960	5044-21	254-6519		4	4	6
			5044-M60	-----				
960	B04	960	B04	-----		4	4	3
960	5117	960	5117	-----		14	14	6
				-----				

[AG 413.8 (27 Aug 53)]

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